Cleanup Technologies

Feasibility Study

Purpose
To develop a range of different hazardous waste management alternatives to provide adequate protection of human health and the environment

Goal
To reduce the toxicity, mobility, or volume of wastes

The Feasibility Study

• Establishes cleanup goals

• Develops general response actions for soil, groundwater, and soil vapor

• Identifies and screens technologies and selects options to carry forward into cleanup alternatives development

• Allows the public to provide information and to have input to the remedy selection process.

Criteria for Selecting Cleanup Alternatives

- ➢ Protection of human health and the environment
- ➢ Compliance with appropriate requirements
- ➢ Long-term effectiveness and permanence
- ➢ Reduction of toxicity, mobility, or volume through treatment
- ➢ Implementability
- ➢ Cost
- ➢ Short-term effectiveness
- ➢ Regulatory acceptance
- ➢ Community acceptance

Cleanup Standards

Goal is to clean up to **background**, but the reality is that usually this is not technically or financially feasible.

➢ Instead cleanup to the following **standards to protect human health and ecological receptors**:

✓ Groundwater (drinking water sources): MCLs

✓ Groundwater (non-drinking water): risk-based

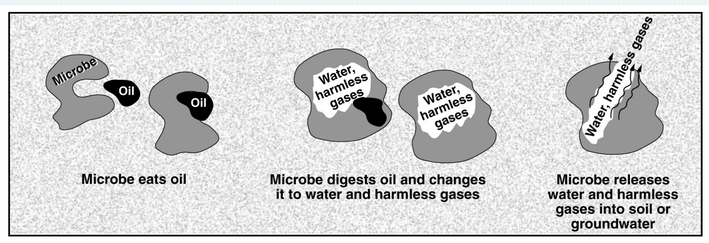
✓ Soil: Basin Plan and risk-based

Potential Cleanup Technologies

Technology	Activities	Advantages	Disadvantages
Pump & Treat	Install well field Long-term pumping Construct above-ground treatment plant	Minimize indoor vapor intrusion	Requires good site characterization and proper installation Takes time
Bio-remediation	Install well field or trench Inject natural bacteria into subsurface	Groundwater not brought to the surface Low cost	Takes time May create more toxic by-products May need replacement if reactions stall
PRB	Install trench and place reactive material (such as iron) in subsurface	Groundwater not brought to the surface Low cost	Takes time but may be more affective over a shorter time than bioremediation Chemicals require proper handling
Air Sparging	Install well field Construct above-ground air pollution control equipment	Groundwater not brought to the surface Low cost	Requires good site characterization and proper installation Takes time
Natural Attenuation	None, uses existing monitoring wells	Groundwater not brought to the surface Low cost	Takes time May not be completely effective

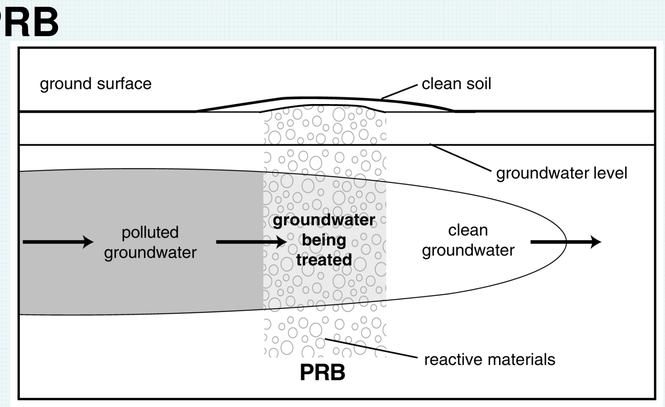
In the Ground Treatment

Bio-remediation



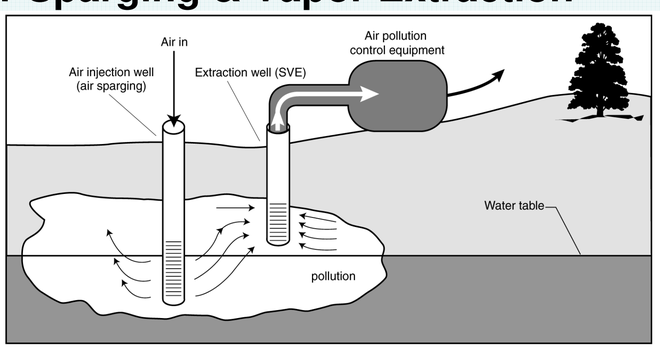
Microbes digest contaminants and release harmless gas

PRB



Chemical agent such as iron reacts with contaminants to reduce toxicity

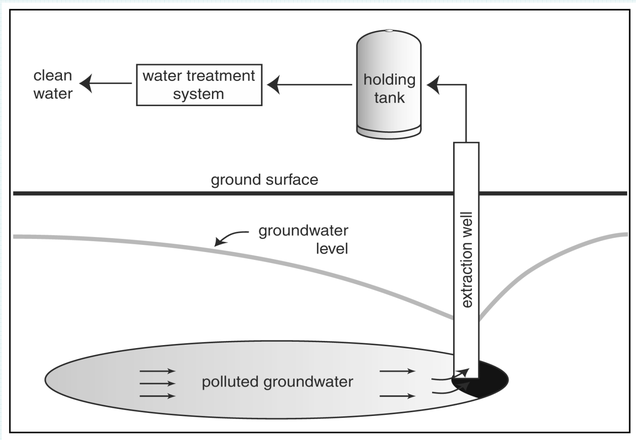
Air Sparging & Vapor Extraction



Air is delivered under pressure and vapors migrate to unsaturated zone for removal

Above Ground Treatment

Pump and Treat



Various treatments such as activated carbon, air stripping, etc.

TREATMENT TRAIN

❖ Inhibit downgradient contaminant migration; protect sensitive receptor

❖Remove large amounts of mass at source area or “hot spot”; reduce the length of time to completion

❖Monitor natural attenuation; long-term monitoring